Diamondoid Derivatives," by Shenggao Liu, Jeremy E. Dahl and Robert M. Carlson, filed October 26, 2001, and also U.S. Provisional Patent Application No.60/341,921 filed December 18, 2001.

<u>In the Claims</u>

Please amend claim 59 as follows:

Sub C1 B2

59. (Amended) A method of nucleating the growth of a diamond film, wherein the film is nucleated with at least one diamondoid selected from the group consisting of triamantane and higher diamondoids.

Please add new claims 61-93 as follows:

Sub C2 B3

61. (New) A method of nucleating the growth of a diamond film, the method comprising the steps of:

a) providing a reactor having an enclosed process space;

b) positioning a substrate within the process space;

c) introducing a process gas into the process space;

d) coupling energy into the process space from an energy source; and

e) injecting at least one diamondoid into the process space, wherein the at least one diamondoid nucleates the growth of the diamond film on the substrate.

62. (New) The method of claim 61, wherein the reactor is configured to carry out a chemical vapor deposition (CVD) technique.

63. (New) The method of claim 62, wherein the chemical vapor deposition technique is a plasma enhanced chemical vapor deposition (PECVD) technique.

64. (New) The method of claim 61, wherein the at least one diamondoid comprises triamantane.

65. (New) The method of claim 61, wherein the at least one diamondoid comprises a higher diamondoid.

Sub C3

66. (New) The method of claim 61, wherein the at least one diamondoid is a substituted diamondoid.

67. (New) The method of claim 61, wherein the nucleation is independent of the nature of the substrate.

68. (New) The method of claim 61, wherein the substrate is a carbide forming substrate.

B3

69. (New) The method of claim 68, wherein the substrate is selected from the group consisting of Si and Mo.

70. (New) The method of claim 61, wherein the substrate is a non-carbide forming substrate.

71. (New) The method of claim 70, wherein the substrate is selected from the group consisting of Ni and Pt.

72. (New) The method of claim 61, wherein the process gas comprises methane and hydrogen.

73. (New) The method of claim 72, wherein the process gas further includes an inert gas.

74. (New) The method of claim 73, wherein the inert gas is argon.

75. (New) The method of claim 61, wherein the energy source comprises an induction coil such that the power coupled into the process space generates a plasma.

76. (New) The method of claim 72, further including the step of converting the hydrogen within the process space to monoatomic hydrogen.

Sub C4

77. (New) The method of claim 61, wherein the injecting step comprises volatilizing the at least one diamondoid by heating such that it sublimes into the gas phase.

78. (New) The method of claim 77, wherein the injecting step includes entrainment of the sublimed diamondoid in a carrier gas which is introduced into the process chamber.

B3

79. (New) The method of claim 78, wherein the carrier gas is at least one gas selected from the group consisting of hydrogen, nitrogen, an inert gas, and a carbon precursor gas.

80. (New) The method of claim 79, wherein the inert gas is a noble gas, and wherein the carbon precursor gas is at least one gas selected from the group consisting of methane, ethane, and ethylene.

81. (New) The method of claim 61, wherein the nucleation rate of the diamondoid film ranges from about 10^4 to 10^{10} cm^{-2} s^{-1}.

82. (New) The method of claim 61, wherein the injecting step allows carbon atoms to be deposited on the substrate 10 or more atoms at a time.

Sub C5

83. (New) The method of claim 61, wherein the injecting of the at least one diamondoid increases the growth rate of the diamond film by a factor of at least two to three times.

84. (New) The method of claim 61, wherein the injecting of the at least one diamondoid increases the growth rate of the diamond film by at least an order of magnitude.

85. (New) The method of claim 61, wherein the injecting of the at least one diamondoid occurs at the beginning of a deposition process.

86. (New) The method of claim 61, wherein the injecting of the at least one diamondoid occurs during at least part of the growth of the diamond film.

87. (New) The method of claim 61, further including the step of selecting a particular diamondoid to facilitate the growth of a diamond film having a desired crystalline orientation.

B3

88. (New) The method of claim 61, wherein the substrate is rotated during at least a part of the growth of the diamond film.

89. (New) A diamond film nucleated by triamantane.

Sub C5

90. (New) A diamond film nucleated by at least one diamondoid selected from the group consisting of triamantane and higher diamondoids.

91. (New) A diamond film nucleated by the steps comprising:

a) providing a reactor having an enclosed process space;

b) positioning a substrate within the process space;

c) introducing a process gas into the process space;

d) coupling energy into the process space from an energy source; and

e) injecting at least one diamondoid into the process space, wherein the at least one diamondoid nucleates the growth of the diamond film on the substrate.

92. (New) The diamond film of claim 90, wherein the diamond film is an ultrananocrystalline film.

93. (New) The diamond film of claim 92, wherein the ultrananocrystalline film has a microstructure comprising a three to five nanometer crystallite size.